tube firmly bound down. The tube was enlarged. The patient made a fair recovery from the operation.

Jan. 16, 1887. Mrs. S. writes: "I have felt very well, and have not needed any medical treatment."

CASE XXII. *Removal of uterine appendages; recovery.*—Mrs. M., æt. thirty-five; three children; the last child was still-born, three years ago; has had *grand mal* for three years. The periods between these attacks have grown less, and now appear every two weeks. Examination shows an enlarged and very tender ovary on the right side.

Jan. 23. Dr. Thomas removed ovaries and tubes. There were no complications, and the patient made a good recovery. She left the hospital in the middle of February.

THE STATION OF MAN, CONSIDERED PHYSIOLOGICALLY AND CLINICALLY.

BY GUY HINSDALE, M.D.,
OF PHILADELPHIA.

IN forming an opinion of a man's physical condition it is desirable to observe not only his gait, but also his power of preserving an erect position while standing—which we technically call station. Even before any question may be asked, the physician can form an approximately correct opinion of the disease as the patient walks into his office, and stands before him.

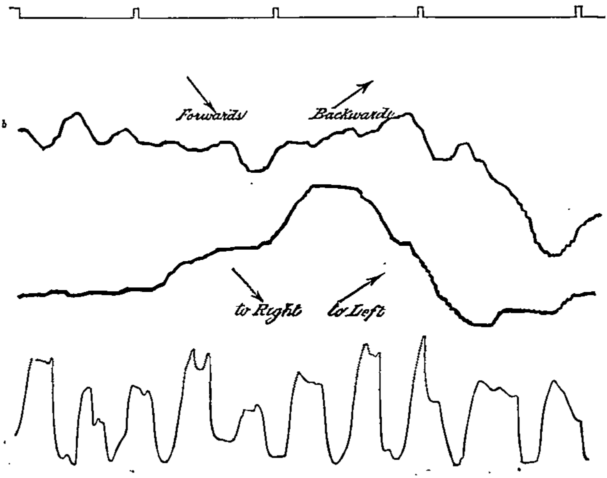
For some time past Dr. Weir Mitchell's attention has been directed toward bringing to an arithmetical precision of statement certain symptoms which we are usually obliged to record with more vagueness of statement than is desirable. One of the most important of these inquiries has been as regards station. For this purpose, Dr. Mitchell suggested and used a simple form of apparatus, already described in a paper by Dr. Morris J. Lewis and himself. At this point, at his request, I took up this study.

In order to do this accurately, it was necessary to construct certain apparatus so that the disturbances of equilibrium might be recorded. This was done with the assistance of Prof. Reichert, in the Physiological Laboratory of the University of Pennsylvania.

To observe the sway of a healthy man, the subject was made to stand with his heels and toes together; his hands were allowed to hang by the side; the head was held erect, the eyes being directed at a fixed object. A record of motions in the antero-posterior line was made by attaching a silk thread to a fillet over the forehead; the thread passed over a pulley, and was connected with a rod moving vertically, and carrying an index. This index marked a smoked paper attached to a drum, which revolved laterally by means of clockwork. A downward movement of the index and a fall of the line scratched on the smoked paper, indicated a forward movement of the head; and an upward line recorded the backward movement.

In like manner the lateral movement was recorded. A silk thread was attached to the side of the head, and was carried at right angles to the forward and backward line, for a few feet, and thence by a pulley so as to move a needle and index at the side of the one recording antero-posterior movement, upon the same blackened surface. The sway for the two directions was thus resolved into upward and downward movements on the same paper. By means of a tube connecting the mouth with a diaphragm which moved a lever and index, the respirations were also, in some instances, recorded. Seconds were marked on the paper by means of clockwork and an electric index. Such a tracing is shown in the accompanying engraving.

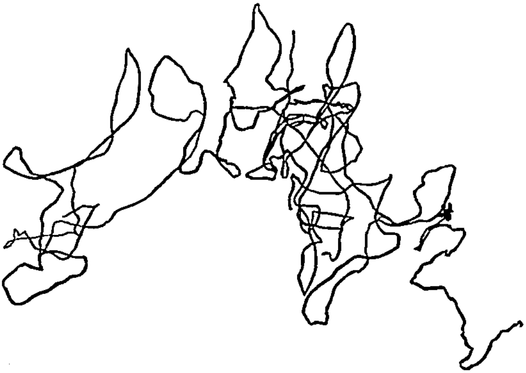
FIG. 1.



a, five second spaces.
b, movement antero-posteriorly.
c, movement laterally.
d, respiration curve.

Other tracings were taken by attaching to the top of a man's head a flat piece of cardboard, upon which was stretched some smoked paper. The subject was then placed under an index, free to move up and down, in a fixed line, and which traced curves on the paper as the subject who stood beneath swayed in any direction. This is the clinical method in practical use at the Infirmary for Nervous Diseases. A tracing from a case of locomotor ataxia is here shown.

FIG. 2.



Sway of a locomotor ataxic.

Other measurements were taken by placing the subject in front of a scale graduated in inches, and noticing the amount and direction of sway, the observer being seated about ten feet distant, and the head steadied; one eye being used in making the observation. When this has been done in front of the subject, the latter is then placed at a right angle to the first position, so that the antero-posterior sway may be recorded; or two observers may make these records simultaneously. The subject in no case is allowed to touch anything; the heels and toes are placed together, and he is not told the object of the inquiry.

This is the coarser method in practical use at Dr. Mitchell's clinic.

It was, of course, found that no man could stand absolutely still; the body swayed forward and backward, and from side to side, in every instance. The sway in the antero-posterior line was found to be greater, as a rule, than the lateral sway; the antero-posterior ranged in health from one-third to one and a half inches; the lateral sway from a quarter to an inch and a half. On closing the eyes, the sway was decidedly increased. This increase shows to how great an extent we use our eyes in correcting these oscillations. When we shut our eyes we cease, to a large degree, to correct these differences.

The first movement is almost invariably forward, then there is a counterbalancing effort, bringing the body backward, and usually to the right. The more pronounced sway is in the antero-posterior line, as may be seen in the tracings; as resultants of these, and of lateral sway, there are minor curves.

Clinically, certain abbreviations may be used in the records of cases, as follows: A. D. (antero-dextral). A. S. (antero-sinistral). P. D. (postero-dextral). P. S. (postero-sinistral). A. 1 D. ¾, would mean that the subject swayed forward one inch, and to the right three-fourths of an inch. This we have found to be the average for normal adults.

The records showed a law of irregular rhythmical motion. This was noticeable chiefly in the forward and backward movement, but these waves of motion did not correspond with respiration as a whole or fractionally.

Respirations per minute were recorded as follows: 21.5, 23, 20–21, 23, 31, 28, 29, 22, etc. In one observation, extending over three minutes, the subject, a healthy Irishman, employed in the physiological laboratory of the University of Pennsylvania, respired in the first minute 27 times, in the next minute 28 times, and in the third minute 26½ times. The tracing, as usual, showed certain waves of antero-posterior motion; of these there were during each of the first three minutes, 12, 11, and 11 respectively. In another instance, in the same individual, the respiration was 22, and the antero-posterior waves 14. In the writer's case, 13 of these waves and 24 respirations were recorded in one minute. Thus the normal man has a rhythmical sway of about 14 to the minute. What governs this as to number is not clear.

A very large percentage of the normal individuals observed seemed inclined when losing their equilibrium to fall forward and then slightly to the right. The motion is greatest in the forward and backward line. The subject, as a rule, does not go so far backward as forward and not so far to the left as to the right.

We have endeavored to ascertain whether the sway to the right or to the left may be coincident with right-handedness or left-handedness. While right-handed people almost invariably are inclined to tilt over to the right, of 22 left-handed people 12 were inclined to tilt to the left.

This at once opens the whole subject of asymmetry. That the right side of the body, as a whole, is usually larger than the left, in persons who are right-handed, is generally accepted. The difference is noticeable in the shoulders and upper extremities. The right arm displaces several more cubic inches of water when immersed in a tube up to a given point, and is stronger than the left.

The weight of the arms being unequal the centre of gravity is, therefore, slightly on the right side; and it has been found that a man who has lost an arm sways to the sound side. "The weight of the arms is so important in correcting the oscillations of the centre of gravity in walking, that if one be lost a runner needs another of the same weight."[1]

The careful weighing of the muscles of the legs and of the back, excised from the body, has shown the right to be in excess.

The cause of this excess is doubtless finally to be referred to the central nervous system. The left cerebral hemisphere, from its slightly greater size, especially in the motor area, and greater density, has been termed the "leading side."

In connection with this it is interesting to state that Flechsig found the decussation of fibres in the anterior pyramid unsymmetrical, more crossing from the left brain to the right of the cord than in the opposite direction. It may, therefore, be that decussation of the motor fibres renders the right side of the body, from a muscular standpoint, the leading side. But Flechsig also found that nearly all the fibres decussated in some instances, forming the posterior column of the lateral opposite half of the spinal cord; however, in rare cases, almost none of the fibres decussated. It would be interesting to determine whether, in these cases, the subjects were or were not left-handed.

As an antithesis to this, M. Bourdon's observation is noteworthy. In the case of a man who forty years previously suffered a disarticulation of the *left arm*, the *right brain* showed a decided depression of the ascending frontal convolution, the paracentral lobule and the convexity of the right hemisphere; there was also enlargement of the right lateral ventricle, due to very extensive atrophy of adjacent white substance. The *right brain* weighed thirty-one grammes less than the left.[2]

The point I wish to make clear is that cerebral development and activity have a direct relation to muscular development and activity of the opposite side of the body. It would therefore not be irrational to suppose that, by educating the muscles of the left side until they were superior to those of the right, the right brain might then be made the leading side and the recognition of this might possibly give to those of delayed mental development a new centre for the cultivation of the powers of both mind and body.

In maintaining the erect position a large number of muscles of the body are in constant activity. Subjects must sway not only to the heavier side but also to the stronger side. The predominating muscles not only exercise this greater influence of their own, but there is probably added an increment of energy due to automatic tone waves created by the constant strain of other muscles in a state of tension.

This factor, combined with actual excess of tissue, produces in most persons an antero-dextral sway. The sinistral sway is found in a majority of left-handed people. It is found rarely in those who are right-handed.

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[1] Hall and Hartwell, Johns Hopkins Univ., "Mind," No. xxxiii.

[2] Revue de Thérapeutique, Med.-Chir., No. 11.

Twelve individuals, mostly young men in good health, were carefully observed, tracings of the sway being recorded on the drum. There was, with the eyes open, a maximum antero-posterior sway of 1.56 inches and a minimum of 0.32 inch, the average being one inch. Laterally the average was 0.78 inch, the maximum being 1.50 inches, and the minimum 0.24 inch.

With the eyes closed these figures were considerably increased. The averages for forward and back and for lateral sway were increased 80 per cent. and 28 per cent. respectively, making 1.8 inch for antero-posterior, and 1 inch for lateral sway. These figures may be considered normal for young men in health.

Allowing the eyes to wander about the room, though the head be not turned—in other words, the absence of fixation of the eyes, reading aloud, and removal of the shoes and stockings, increase the bodily sway. In one instance the lateral sway of a man was one-fourth of an inch. Removal of the shoes and stockings increased this to 1¾ inches. The antero-posterior sway in the same instance was 1.52 inches, but after removal of shoes 2.88 inches—almost double. Comparisons made with eyes shut, with shoes and without shoes, showed a corresponding increment. In the writer's case this increment was 16 per cent. for antero-posterior and 12 per cent. for lateral sway. In a number of observations the increase of sway varied considerably; no changes were observed excepting that of extent of the oscillation.

Twenty-five girls, between the ages of seven and thirteen, were examined in orphanages. The lateral sway averaged 1.06 inches, the antero-posterior sway 1.08 inches. Shutting the eyes increased this sway about 40 per cent.

Eleven boys yielded slightly greater figures than in the case of girls—an increase of 7 per cent. for lateral sway, and 13 per cent. for antero-posterior sway.

Children sway absolutely more than adults, and there is a greater equality in their cases between the antero-posterior and the lateral sway.

Thirty-nine inmates of the Institution for the Blind were examined, by permission of Dr. Harlan. The average lateral deviation was found to be 1.4 inches; the antero-posterior deviation 1.7 inches. This is about the normal sway of healthy individuals with their eyes shut, and shows that the blind, even after years of experience, are not able to preserve their equilibrium better than the man who is momentarily deprived of eyesight.

Seventeen deaf-mutes, between fourteen and twenty-four years of age, were examined at the Institution for the Deaf and Dumb, by permission of Dr. Wharton. The average lateral sway was found to be 0.93 inch, and the average antero-posterior sway 0.85 inch. With the eyes shut the sway increased so that the average for lateral sway became 1.18 inches, an increment of 27 per cent., and the antero-posterior sway 1.31 inches, an increment of 54 per cent. It may be said of these figures that the boys are trained in military practice, and that their shoes are stout and have broad soles. They were all right-handed; they all swayed to the right excepting two, one of whom swayed to the left, the other swayed to both right and left.

Opportunity was taken at this time to test the liability of deaf-mutes to become dizzy. It was discovered by Prof. William James, of Harvard University,[1] that deaf-mutes, in whom the semicircular canals are frequently diseased or destroyed, are not so likely as others to lose their equilibrium or to become dizzy. Three boys were turned rapidly about while standing on their feet; they were then told to walk rapidly down a line on the floor. Although they were turned a dozen or more times, they were all able to walk a straight line without wavering. A fourth confessed he was very dizzy, and diverged widely from the line. The three who were first tested were far better able to keep the line than was the writer.

The influence of ether on station was also observed, with the aid of Dr. W. C. Lott. Tracings from both of us were obtained. We took the ether in the standing position so that the index of the apparatus could write at any desired moment. As the ether was taken the writer seemed to be pivoted as a top when nearly done spinning, and finally it seemed as though the feet were not resting upon any solid foundation. The tracings, apparently, do not show anything more than a great exaggeration of the normal sway.

In several cases of locomotor ataxia the sway with the eyes open was observed to vary from 2.25 inches to 3.75 inches in the antero-posterior line, one from 2.50 inches to 3.25 inches laterally. One of these has been engraved. Six observations with the eyes shut showed a lateral sway of 3 to 6 inches, and antero-posteriorly 3 to 7 inches. An interesting tracing of a case of spastic paralysis showed that the oscillations were almost wholly in the antero-posterior line. Ten tracings from cases of chorea were taken. With the eyes open, the lateral deviation averaged 1.45 inches; the antero-posterior deviation, 2.35 inches. The sway slightly increased when the eyes were shut.

As a result of these observations there arise certain valuable formulæ which point to further physiological research and have direct clinical utility.

They show that the normal man and woman have an average sway of about one inch in the forward and back line, and three-quarters of an inch laterally.

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[1] The Sense of Dizziness in Deaf-Mutes. By Wm. James, M.D. Amer. Journ. Otology, Oct. 1882.

That children sway to a slightly greater extent than adults, and that, both in adults and in children, closing the eyes increases the sway about 50 per cent.

An artificial agent, such as ether, simply exaggerates the normal sway.

That a law of rhythmical motion governs the sway of man. The cause of this is not yet clear.

The methods introduced by Dr. Mitchell for studies of this kind enable clinical inquirers to make accurate statements which may be comparable with the observations of others.

EXCISION OF THE ENTIRE CLAVICLE FOR CENTRAL CARCINOMA.

By John Sloan, M.D.,
of New Albany, Indiana.

James F. M., of Washington Co., Indiana, came to my office November 21, 1885, with his physician, Dr. Maxedon, to consult me in relation to an enlargement of his right clavicle. He was fourteen years old, large and robust. Had had pain in the bone since May; observed an enlargement October 15th, and consulted his physician. It had grown rapidly, extending upward and inward, the greater enlargement about two and a half inches from the sternum. I advised its immediate removal.

He returned November 28th, accompanied by Dr. M. and two other physicians of his town, who, with several others of this city, assisted in the operation. On examining the mobility of the shoulder, before placing him on the table, I fractured the bone, which made the operation more protracted. He took chloroform kindly. An incision was made from the centre of the sternum to a little beyond the acromial extremity of the bone; the parts were dissected from the anterior surface; it was disarticulated from the scapula, a noose of cord placed around it for traction; and it was carefully separated from its connections with probe-pointed scissors and scalpel to the place of fracture. The sternal fragment was seized with forceps, disarticulated from the sternum, and carefully dissected out. Arteries as divided were seized and held by compressors. Capillary hemorrhage was arrested by hot sponges.

The time occupied in the removal was forty-five minutes. Three small tents of twisted marine lint were placed in the wound for drainage, it was closed with wire sutures, dressed with a compress of marine lint